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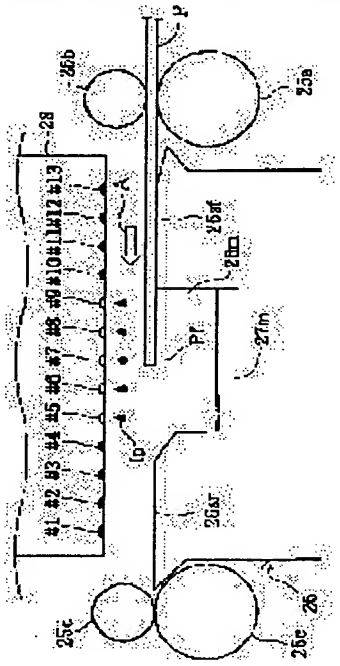
(54) PRINTING UP TO END PART OF PRINT SHEET WITHOUT CONTAMINATING PLATEN

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a technology for printing up to the end part of a print sheet without hitting an ink drop against a platen by means of a dot printer recording dots on the surface of a print medium using a dot recording head provided with a plurality of dot forming elements ejecting ink drops.
SOLUTION: A print sheet P is fed (sub-scan feeding) while being held by upstream side sheet feed rollers 25a and 25b. When the front end Pf of the print sheet P is located above the opening of a groove part 26m, printing is started by ejecting ink drops Ip from the nozzles #5-#9 of an print head 28. Since print is started when the front end Pf of the print sheet P is located in the rear of a nozzle #5 (upstream in the sub-scanning direction), an image can be printed up to the end of the print sheet P with no margin at the front end Pf regardless of some sheet feed error. Since a nozzle being used is located above the groove 26m, an ink drop not hitting the print sheet P does not adhere to the upper surface of a platen 26 to cause contamination of a print sheet being fed later. Subsequently, an image is printed onto the print sheet P by means of the nozzles #5-#9.



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CLAIMS

[Claim(s)]
[Claim 1] It is the dot recording device which records a dot on the surface of print media using the dot recording head in which the dot formative element group which consists of two or more dot formative elements which carry out the regurgitation of the ink droplet was prepared. The horizontal-scanning mechanical component which drives at least one side of said dot recording head and said print media, and performs horizontal scanning, So that said dot formative element group may be faced in the head mechanical component in which drive at least the part of said two or more dot formative elements in the midst of said horizontal scanning, and a dot is made to form, and a part of course [at least] of said horizontal scanning The platen which is extended and prepared towards said horizontal scanning, and supports said print media so that said dot recording head may be faced, It has the vertical-scanning mechanical component which drives said print media in the intervals of said horizontal scanning in the direction of said horizontal scanning, and the direction at which it crosses, and performs vertical scanning, and a control section for controlling said each part. Said platen In the location which faces the specific dot formative element group which consists of a specific dot formative element located within the limits of predetermined [of the direction of said vertical scanning of said two or more dot formative elements] It has the slot extended and prepared towards said horizontal scanning. Said control section In the 1st image print mode which prints an image to an edge, without establishing a margin at least about one side of the upper limit of said print media, and a lower limit It is the dot recording device which uses only said specific dot formative element group, and is equipped with the 1st control section which forms a dot about the edge which prints an image, without establishing the margin of said print media at least.
[Claim 2] It is the dot recording device which consists of a dot formative element located within the limits of are a dot recording device according to claim 1, and predetermined [of the direction of said vertical scanning of said two or more dot formative elements / of the central neighborhood] in said specific dot formative element group.
[Claim 3] It is the dot recording device with which it is a dot recording device according to claim 2, and said slot is established in the position of the center of abbreviation of the direction of said vertical scanning of said platen.
[Claim 4] It is the dot recording device which is the dot formative element group which is a dot recording device according to claim 1, and does not contain the dot formative element located in the edge of the lower stream of a river of the direction of said vertical scanning of said two or more dot formative elements including the dot formative element to which said specific dot formative element group is located in the edge of the upstream of the direction of said vertical scanning of said two or more dot formative elements.
[Claim 5] It is the dot recording device which is the dot formative element group which is a dot recording device according to claim 1, and does not contain the dot formative element located in the edge of the upstream of the direction of said vertical scanning of said two or more dot formative elements including the dot formative element to which said specific dot formative element group is located in the edge of the lower stream of a river of the direction of said vertical scanning of said two or more dot formative elements.

[Claim 6] It is the dot recording device which forms all the dots that are dot recording devices according to claim 1, and said 1st control section uses only said specific dot formative element group in said 1st image print mode, and constitute an image on said print media.
[Claim 7] It is the dot recording device which uses said specific dot formative element group and said dot formative elements other than said specific dot formative element group, and is equipped with the 2nd control section which forms the dot which constitutes an image on said print media in the 2nd image print mode which it is a dot recording device according to claim 6, and said control section prepares a margin in the upper limit and lower limit of said print media further, and prints an image.
[Claim 8] It is the dot recording device formed one by being a dot recording device according to claim 1 to 7, preparing said dot recording head so that it may stand in a line towards said horizontal scanning, and having two or more dot formative element groups which carry out the regurgitation of the ink different, respectively so that said slot may face said specific dot formative element group of two or more of said dot formative element groups.
[Claim 9] It is a dot recording device according to claim 1 to 7. Said slot About the direction of said horizontal scanning, it is prepared for a long time than the width of the direction of said horizontal scanning of said print media. Said 1st control section When it is in the location where the dot formative element contained in said specific dot formative element group faces the side edge section of said print media supported by said platen, And the dot recording device which breathes out an ink droplet from said dot formative element, and is equipped with the side edge printing section which records the dot in the side edge section of said print media when it is in the location which is the field of the outside of said print media supported by said platen, and faces said slot.
[Claim 10] In the dot recording device which records a dot on the surface of print media using the dot recording head in which the dot formative element group which consists of two or more dot formative elements which carry out the regurgitation of the ink droplet was prepared Driving at least one side of said dot recording head and said print media, and performing horizontal scanning Drive at least the part of said two or more dot formative elements, and a dot is formed. So that it may be the dot record approach of driving said print media in the intervals of said horizontal scanning in the direction of said horizontal scanning, and the direction at which it crosses, and performing vertical scanning and said dot formative element group may be faced in a part of course [at least] of the (a) aforementioned horizontal scanning Are extended and prepared towards said horizontal scanning, and said print media is supported so that said dot recording head may be faced. The process for which the platen which has the slot extended and established in the location which faces the specific dot formative element group which consists of a specific dot formative element located within the limits of predetermined [of the direction of said vertical scanning of said two or more dot formative elements] towards said horizontal scanning is prepared, (b) In the 1st image print mode which forms an image to an edge, without establishing a margin at least about one side of the upper limit of said print media, and a lower limit It is the dot record approach which uses only said specific dot formative element group, and is equipped with the process which forms a dot about the edge which prints an image, without establishing the margin of said print media at least.
[Claim 11] It is the dot record approach which consists of a dot formative element located within the limits of are the dot record approach according to claim 10, and predetermined [of the direction of said vertical scanning of said two or more dot formative elements / of the central neighborhood] in said specific dot formative element group and which is a dot formative element group.
[Claim 12] It is the dot record approach which is the dot formative element group which is the dot record approach according to claim 10, and does not contain the dot formative element located in the edge of the lower stream of a river of the direction of said vertical scanning of said two or more dot formative elements including the dot formative element to which said specific dot formative element group is located in the edge of the upstream of the direction of said vertical scanning of said two or more dot formative elements.
[Claim 13] It is the dot record approach which is the dot formative element group which is the

dot record approach according to claim 10, and does not contain the dot formative element located in the edge of the upstream of the direction of said vertical scanning of said two or more dot formative elements including the dot formative element to which said specific dot formative element group is located in the edge of the lower stream of a river of the direction of said vertical scanning of said two or more dot formative elements.

[Claim 14] Said process (b) is the dot record approach which is the process which uses [in / are the dot record approach according to claim 10, and / said 1st image print mode] only said specific dot formative element group, and forms all the dots that constitute an image on said print media.

[Claim 15] The dot record approach which is the dot record approach according to claim 14, uses said specific dot formative element group and said dot formative elements other than said specific dot formative element group, and is equipped with the process which forms the dot which constitutes an image on said print media in the 2nd image print mode which prepares a margin in the upper limit and lower limit of the (c) aforementioned print media, and prints an image further.

[Claim 16] It is the dot record approach according to claim 10 to 15. Said slot About the direction of said horizontal scanning, it is prepared for a long time than the width of the direction of said horizontal scanning of said print media. Said dot record approach Furthermore, when it is in the location where the dot formative element contained in the (d) aforementioned specification dot formative element group faces the side edge section of said print media supported by said platen, And the dot record approach which breathes out an ink droplet from said dot formative element, and is equipped with the process which records the dot in the side edge section of said print media when it is in the location which is the field of the outside of said print media supported by said platen, and faces said slot.

[Claim 17] In the dot recording device which records a dot on the surface of print media using the dot recording head in which the dot formative element group which consists of two or more dot formative elements which carry out the regurgitation of the ink droplet was prepared Driving at least one side of said dot recording head and said print media, and performing horizontal scanning Drive at least the part of said two or more dot formative elements, and a dot is formed. So that it may be the dot record approach of driving said print media in the intervals of said horizontal scanning in the direction of said horizontal scanning, and the direction at which it crosses, and performing vertical scanning and said dot formative element group may be faced in a part of course [at least] of the (a) aforementioned horizontal scanning Are extended and prepared towards said horizontal scanning, and said print media is supported so that said dot recording head may be faced. The process for which the platen which has the slot extended and established in the location which faces the specific dot formative element group which consists of a specific dot formative element located within the limits of predetermined [of the direction of said vertical scanning of said two or more dot formative elements] towards said horizontal scanning is prepared, (b) The 1st image print mode which forms an image to an edge, without establishing a margin at least about one side of the upper limit of said print media, and a lower limit, The 2nd image print mode which prepares a margin in the upper limit and lower limit of said print media, and prints an image, About the process which chooses whether it is ********, and the edge which prints an image, without establishing the margin of said print media at least when the image print mode of the (c) above 1st is chosen The process which uses only said specific dot formative element group, and forms a dot, (d) The dot record approach which uses said specific dot formative element group and said dot formative elements other than said specific dot formative element group, and is equipped with the process which forms the dot which constitutes an image on said print media when said 2nd image print mode is chosen.

[Claim 18] It is the dot record approach which consists of a dot formative element located within the limits of are the dot record approach according to claim 17, and predetermined [of the direction of said vertical scanning of said two or more dot formative elements / of the central neighborhood] in said specific dot formative element group and which is a dot formative element group.

[Claim 19] Said process (c) is the dot record approach which is the process which uses [in /

are the dot record approach according to claim 17, and / said 1st image print mode] only said specific dot formative element group, and forms all the dots that constitute an image on said print media.

[Claim 20] It is the dot record approach according to claim 17 to 19. Said slot About the direction of said horizontal scanning, it is prepared for a long time than the width of the direction of said horizontal scanning of said print media. Said dot record approach Furthermore, when it is in the location where the dot formative element contained in the (e) aforementioned specification dot formative element group faces the side edge section of said print media supported by said platen, And the dot record approach which breathes out an ink droplet from said dot formative element, and is equipped with the process which records the dot in the side edge section of said print media when it is in the location which is the field of the outside of said print media supported by said platen, and faces said slot.

[Claim 21] To a computer equipped with the dot recording device which records a dot on the surface of print media using the dot recording head in which the dot formative element group which consists of two or more dot formative elements which carry out the regurgitation of the ink droplet was prepared Driving at least one side of said dot recording head and said print media, and performing horizontal scanning Drive at least the part of said two or more dot formative elements, and a dot is formed. It is the record medium which recorded the computer program for driving said print media in the intervals of said horizontal scanning in the direction of said horizontal scanning, and the direction at which it crosses, and making vertical scanning perform and in which computer reading is possible. Said dot recording device so that said dot formative element group may be faced in a part of course [at least] of said horizontal scanning Are extended and prepared towards said horizontal scanning, and said print media is supported so that said dot recording head may be faced. Have the slot extended and established in the location which faces the specific dot formative element group which consists of a specific dot formative element located within the limits of predetermined [of the direction of said vertical scanning of said two or more dot formative elements] towards said horizontal scanning. In the 1st image print mode which prints an image to an edge, without having the platen and said record medium establishing a margin at least about one side of the upper limit of said print media, and a lower limit It is the record medium which is recording the computer program for making said computer realize the function which uses only said specific dot formative element group, and forms a dot about the edge which prints an image, without establishing the margin of said print media at least and in which computer reading is possible.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the technique which prints to the edge of a print sheet about the technique which records a dot on the surface of a record medium using a dot recording head, without soiling a platen especially.
[0002]
[Description of the Prior Art] In recent years, the printer which carries out the regurgitation of the ink from the nozzle of the print head has spread widely as an output unit of a computer. Drawing 20 is the side elevation showing the circumference of the print head of the conventional printer. A print sheet P is supported so that head 28o may be faced on platen 26o. And a print sheet P is sent in the direction of an arrow head A with the upstream paper feed rollers 25p and 25q arranged on the upstream of platen 26o, and the downstream paper feed rollers 25r and 25s arranged on the lower stream of a river of a platen 26. If ink is breathed out from a head, on a print sheet P, one by one, a dot will be recorded and an image will be printed.
[0003]
[Problem(s) to be Solved by the Invention] If it is going to print an image to the edge of a print sheet in the above printers, it is necessary to arrange a print sheet so that the edge of a print sheet may be located on a print head lower part, i.e., a platen, and to make an ink droplet breathe out from the print head. However, in such printing, from the print sheet edge which an ink droplet should carry out this arrival cartridge, it may shift and may reach the target on a platen by the error of delivery of a print sheet, gap of the impact location of an ink droplet, etc. In such a case, the print sheet which passes through a platen top after that will be soiled in the ink which reached the target on the platen.
[0004] This invention is made in order to solve the above-mentioned technical problem in the conventional technique, and it aims at offering the technique which prints to the edge of a print sheet, without making an ink droplet reach a platen.
[0005]
[The means for solving a technical problem, and its operation and effectiveness] In order to solve a part of above-mentioned technical problem [at least], in this invention, predetermined processing is performed for the dot recording device which records a dot on the surface of print media using the dot recording head in which the dot formative element group which consists of two or more dot formative elements which carry out the regurgitation of the ink droplet was prepared. The horizontal-scanning mechanical component which this dot recording device drives at least one side of a dot recording head and print media, and performs horizontal scanning, So that a dot formative element group may be faced in the head mechanical component which at least the part of two or more dot formative elements is driven [mechanical component] to the midst of horizontal scanning, and makes a dot form in it, and a part of course [at least] of horizontal scanning It is extended and prepared towards horizontal scanning and has the platen which supports print media so that a dot recording head may be faced, the vertical-scanning mechanical component which drives print media in the intervals of horizontal scanning in the direction of horizontal scanning, and the direction at which it crosses, and performs vertical

scanning, and a control section for controlling each part. And the platen has the slot extended and established in the location which faces the specific dot formative element group which consists of a specific dot formative element located within the limits of predetermined [of the direction of vertical scanning of two or more dot formative elements] towards horizontal scanning.
[0006] In such a dot recording device, about the edge which prints an image, without establishing the margin of print media at least in the 1st image print mode which prints an image to an edge, without establishing a margin at least about one side of the upper limit of print media, and a lower limit, only a specific dot formative element group is used and a dot is formed. Even if such a mode, then the ink droplet breathed out towards the edge of print media from the dot formative element on the occasion of printing separate from print media as a result, the ink droplet will reach the target in a slot. Therefore, possibility of soiling a platen top face in printing which forms a dot to the edge of the upper and lower sides of print media is low. In addition, it is the semantics of not using dot formative elements other than the specification dot formative element group "using only a specific dot formative element group" here, but using a part of dot formative element [at least] contained in a specific dot formative element group.
[0007] As for a specific dot formative element group, it is desirable that it is the dot formative element group which consists of a dot formative element located within the limits of predetermined [of the direction of vertical scanning of two or more dot formative elements / of the central neighborhood]. In printing of such a mode, then the edge of a record medium, a dot can be formed using the dot formative element of the central neighborhood. For this reason, the center section of a record medium is recordable with the nozzle of the upstream of the direction of vertical scanning from the central neighborhood, recording the upper limit section of a record medium using the dot formative element of the central neighborhood. Similarly, the center section of a record medium is recordable with the nozzle of the downstream from the central neighborhood, recording the lower limit section of a record medium using the dot formative element of the central neighborhood.
[0008] In addition, as for a slot, it is desirable to prepare in the position of the center of abbreviation of the direction of vertical scanning of a platen. In such a mode, print media will be supported to the platen before and behind a slot (the upstream and the downstream of a direction of vertical scanning), and can fall easily neither in the upper limit of print media, nor lower limit fang furrow circles in the case of vertical scanning.
[0009] Moreover, it can also consider as the dot formative element group which does not contain the dot formative element located in the edge of the lower stream of a river of the direction of vertical scanning of two or more dot formative elements in a specific dot formative element group including the dot formative element located in the edge of the upstream of the direction of vertical scanning of two or more dot formative elements. The center section of a record medium is recordable with the nozzle of the downstream from a specific dot formative element group, recording such a mode, then the lower limit section of a record medium using the specific dot formative element group comparatively located in the upstream.
[0010] And it can also consider as the dot formative element group which does not contain the dot formative element located in the edge of the upstream of the direction of vertical scanning of two or more dot formative elements in a specific dot formative element group including the dot formative element located in the edge of the lower stream of a river of the direction of vertical scanning of two or more dot formative elements. The center section of a record medium is recordable with the nozzle of the upstream of the direction of vertical scanning from a specific dot formative element group, recording such a mode, then the upper limit section of a record medium using the specific dot formative element group comparatively located in the downstream.

[0011] Moreover, in the 1st image print mode, only a specific dot formative element group can be used and all the dots that constitute an image can also be formed on print media. Possibility of soiling a platen on the occasion of formation of the dot to such a mode, then print media is low.
[0012] Moreover, in the 2nd image print mode, it is good also as using a specific dot formative element group and dot formative elements other than a specific dot formative element group,

and forming the dot which constitutes an image on print media. The 1st image print mode which does not prepare a margin in such a mode, then print media, and the 2nd image print mode which establishes a margin can be carried out. And in the 2nd image print mode, many dot formative elements can be used compared with the 1st image print mode, and more nearly high-speed printing can be performed. In addition, it is the semantics of using a part of dot formative element [at least] contained in the specification dot formative element group "using a specific dot formative element group" here.

[0013] When it has two or more dot formative element groups which carry out the regurgitation of the ink in which a dot recording head is prepared so that it may stand in a line towards horizontal scanning, and they differ, respectively, it is desirable to perform it as follows. That is, one slot is prepared so that the specific dot formative element group of two or more dot formative element groups may be faced. In such a mode, then the 1st image print mode, a dot can be formed using different ink. And since one slot is only established in the platen, on a platen, it is stabilized and print media can be supported.

[0014] In addition, it can also consider as the mode which can also consider as the mode which the 1st image print mode and the 2nd image print mode both perform on the occasion of printing to print media, and chooses either.

[0015] moreover, when the slot is prepared about the direction of horizontal scanning for a long time than the width of the direction of horizontal scanning of print media When it is in the location where the dot formative element contained in a specific dot formative element group faces the side edge section of the print media supported by the platen, And when it is in the location which is the field of the outside of the print media supported by the platen, and faces a slot, it is desirable to breathe out an ink droplet from a dot formative element, and to record the dot in the side edge section of print media. It can print without a margin to the side edge of print media, without soiling such a mode, then a platen top face.

[0016] In addition, this invention can be realized in various modes as shown below.

(1) A dot recording device, a print control unit, an airline printer.

(2) The dot record approach, the printing control approach, the printing approach.

(3) The computer program for realizing above-mentioned equipment and an above-mentioned approach.

(4) The record medium which recorded the computer program for realizing above-mentioned equipment and an above-mentioned approach.

(5) The data signal embodied in the subcarrier including the computer program for realizing above-mentioned equipment and an above-mentioned approach.

[0017]

[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained in order of the following based on an example.

A. outline [of an operation gestalt]: -- B. 1st example: -- configuration [of B1. equipment]: -- selection [of B-2. image print mode]: -- B3. printing: -- C. 2nd example: -- E. modification: -- an E1. modification 1:E2. modification -- 2:E3. modification 3:E4. modification 4: [0018] A. The outline of an operation gestalt : drawing 1 is the side elevation showing the surrounding structure of the print head of the ink jet printer in the gestalt of operation of this invention. In drawing 1 , the print sheet P is held and sent to the upstream paper feed rollers 25a and 25b (vertical-scanning delivery), and it has resulted on opening which is 26m of the front end Pf fang furrow section. At this time, an ink droplet Ip is breathed out from nozzle #5-#9 of the print head 28, and printing is started. In addition, when the misfeed difference of a print sheet P is estimated more greatly, before resulting on opening which is 26m of front end Pf fang furrow sections, the regurgitation of an ink droplet Ip may be begun. Anyway, since printing is started when the front end Pf of a print sheet P is after nozzle #5 (upstream of the direction of vertical scanning), even if there are some paper feed errors, an image can be printed to an edge, without making a margin in the front end section Pf of a print sheet P. Moreover, since nozzle #5-#9 used are a nozzle on 26m of slots, the ink droplet which did not reach a print sheet P is absorbed by 27m of absorption members prepared in the bottom of 26m of slots. Therefore, it adheres to upstream supporter 26sf and 26 steradians of downstream supporters which are the top face of a platen

26, and the print sheet sent behind is not soiled. Henceforth, printing of the image to a print sheet P is performed by nozzle #5-#9. Since it is carried out when it is also about the lower limit of a print sheet P on opening which is 26m of lower limit section fang furrow sections, an image is formed without a margin.

[0019] B. 1st example: -- configuration [of B1. equipment]: -- drawing 2 is the block diagram showing the configuration of the software of this airline printer. By computer 90, the application program 95 is operating under a predetermined operating system. The video driver 91 and the printer driver 96 are included in the operating system, and image data D for transmitting to a printer 22 will be outputted to it through these drivers from an application program 95. The application program 95 which performs the retouch of an image etc. reads an image from a scanner 12, and it shows the image to CRT21 through a video driver 91, performing predetermined processing to this. The data ORG supplied from a scanner 12 are the original color picture data ORG which are read in a color copy and consist of a color component of (Red R) Green (G) and three colors of blue (B).

[0020] If this application program 95 emits a printing instruction, the printer driver 96 of a computer 90 will change image data into reception from an application program 95, and will have changed this into the signal (signal multiple-value-ized here about each color of cyanogen, a Magenta, light cyanogen, a light Magenta, Hierro, and black) which can process a printer 22. The interior of a printer driver 96 is equipped with the resolution conversion module 97, the color correction module 98, the halftone module 99, and the rasterizer 100 in the example shown in drawing 2 . Moreover, the color correction table LUT and the dot formation pattern table DT are memorized.

[0021] The resolution conversion module 97 plays the role changed into the resolution of the color picture data which the application program 95 is treating, i.e., the resolution in which a printer driver 96 can treat the number of pixels per unit length. in this way, the cyanogen (C) which a printer 22 uses for every pixel, the color correction module 98 referring to the color correction table LUT since the image data by which resolution conversion was carried out is image information which still consists of three colors of RGB, a Magenta (M), light cyanogen (LC), a light Magenta (LM), and Hierro -- it changes into the data of each color of (Y) and black (K). In addition, a "pixel" is the grid of the shape of a grid defined on print media virtually (on outside which is print media depending on the case), in order to specify the location which an ink droplet is made to reach the target and records a dot.

[0022] The data by which color correction was carried out have the gradation value by width of face, such as for example, 256 gradation. By distributing and forming a dot, the halftone module 99 is a printer 22 and performs half toning for expressing this gradation value. The halftone module 99 performs half toning, after setting up the dot formation pattern of each ink dot by referring to the dot formation pattern table DT according to the gradation value of image data. In this way, the processed image data is rearranged in order of the data which should be transmitted to a printer 22 by the rasterizer 100, and is outputted as final print-data PD. Print-data PD contains the data in which the raster data showing the record condition of the dot at the time of each horizontal scanning and a vertical-scanning feed per revolution are shown. In this example, although it is only playing the role which forms an ink dot according to print-data PD and the printer 22 is not performing the image processing, it does not interfere as what performs these processings by the printer 22, of course.

[0023] Next, drawing 3 explains the outline configuration of a printer 22. This printer 22 consists of the device in which Form P is conveyed by the paper feed motor 23, a device in which carriage 31 is made to reciprocate to the shaft orientations of a platen 26 by the carriage motor 24, a device in which drive the print head 28 carried in carriage 31, and formation of the regurgitation of ink and an ink dot is performed, and a control circuit 40 that manages an exchange of a signal with these paper feed motors 23, the carriage motor 24, the print head 28, and a control panel 32 so that it may illustrate.

[0024] The device in which carriage 31 is made to reciprocate to the shaft orientations of a platen 26 is constructed in the direction perpendicular to the conveyance direction of a print sheet P, and consists of location detection sensor 39 grades which detect the pulley 38 which

stretches the endless driving belt 36 between the sliding shafts 34 and the carriage motors 24 which hold carriage 31 possible [sliding], and the home position of carriage 31.
[0025] carriage 31 -- the cartridge 71 for black ink (K), cyanogen (C), light cyanogen (LC), a Magenta (M), light MAZENDA (LM), and Hierro -- the cartridge 72 for color ink which contained the ink of six colors of (Y) can be carried. If a total of six heads 61 for ink regurgitation thru/or 66 are formed in the print head 28 of the lower part of carriage 31 and carriage 31 is equipped with the cartridge 71 for black (K) ink, and the cartridge 72 for color ink from the upper part, supply of the head 61 for regurgitation thru/or the ink of 66 will be attained from each ink cartridge.
[0026] Drawing 4 is the explanatory view showing the array of the ink jet nozzle N in the print head 28. Arrangement of these nozzles consists of 6 sets of nozzle arrays which carry out the regurgitation of the ink for black (K), cyanogen (C), and light (cyanogen LC) (Magenta M) light MAZENDA (LM) (Hierro Y) each color of every, and is arranged by the single tier in the nozzle pitch k with 48 fixed nozzles, respectively. 6 sets of these nozzle arrays are arranged so that it may stand in a line along a main scanning direction. In addition, a "nozzle pitch" is a value which shows a part for what raster (a part for namely, what pixel) spacing of the direction of vertical scanning of the nozzle allotted on the print head is. For example, the pitch k of the nozzle which opens spacing for three rasters in between, and is allotted is 4. In addition, a "raster" is the train of the pixel on a par with a main scanning direction.
[0027] The train of the nozzle which carries out the regurgitation of the ink of each [these] color is the "dot formative element group" said to a claim. And the nozzle prepared in range R26m shown in drawing 4 with the broken line among the nozzles of each nozzle train is "the specific dot formative element group" said to a claim. Range R26m shown in drawing 4 with the broken line is the predetermined range of the central neighborhood of the direction of vertical scanning of the nozzles on the print head 28. In the platen 26 which faces the print head 28, 26m of slots is established in this corresponding range R26m part. That is, the "specific dot formative element group" of each [these] color nozzle train is prepared in the location which faces 26m of slots. It writes the nozzle group [the set of "the specific dot formative element group" of each / these / color nozzle train] Nm.
[0028] Here, it can consider as the range which does not contain the nozzle of the both ends of the direction of vertical scanning with "the predetermined range of the central neighborhood." And it is desirable to consider as the range containing 1/2 or less nozzle in the nozzle prepared in the direction of vertical scanning including the nozzle located in the center of the direction of vertical scanning. Moreover, it can also consider as the range containing 1/3 or less nozzle in the nozzle prepared in the direction of vertical scanning including the nozzle located in the center of the direction of vertical scanning. In addition, when the nozzle located in the center of the direction of vertical scanning cannot be specified as one but there are two nozzles in an equal distance from a center, this the "predetermined range of the central neighborhood" shall contain both those nozzles.
[0029] Drawing 5 is the top view showing the circumference of a platen 26. The platen 26 is formed towards horizontal scanning by this printer 22 for a long time than the maximum width of the usable print sheet P. And the upstream paper feed rollers 25a and 25b are formed in the upstream of a platen 26. They are two or more small rollers which upstream paper feed roller 25b rotates freely to upstream paper feed roller 25a being one driving roller. Moreover, the downstream paper feed rollers 25c and 25d are formed in the lower stream of a river of a platen. Downstream paper feed roller 25c is two or more rollers formed in the driving shaft, and downstream paper feed roller 25d is two or more small rollers which rotate freely. The slot is established in the downstream paper feed roller 25d peripheral face in parallel with the direction of a revolving shaft. That is, downstream paper feed roller 25d, it has the gear tooth (part between slots) in the peripheral face at the radial, and when it sees from a revolving shaft, it is visible to a gearing-like configuration. This downstream paper feed roller 25d, it is called a common name "Giza Laura" and the role which pushes a print sheet P on a platen 26 is played. In addition, downstream paper feed roller 25c and upstream paper feed roller 25a rotate synchronously so that the speed of a periphery may become equal.

[0030] 26m of central slots is prepared near [central] the direction of vertical scanning at the platen 26. Upstream supporter 26sf, a call, and the platen top face of the upstream are called 26 steradians of downstream supporters for the platen top face of the upstream of 26m of this central slot. 26m of central slots is prepared by this printer 22 along the main scanning direction for a long time than the maximum width of the usable print sheet P, respectively. And 27m of absorption members for absorbing this in response to an ink droplet Ip, respectively is allotted to the pars basilaris ossis occipitalis of 26m of central slots. And 26m of central slots is established in the location which faces the nozzle group Nm (nozzle of the part shown with a slash in drawing 5) which consists of a predetermined nozzle located within the limits of predetermined [of the direction of vertical scanning / of the central neighborhood] among the nozzles N on the print head 28.
[0031] The print head 28 reciprocates the platen 26 top inserted into the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d in horizontal scanning. A print sheet P is held at the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d, and it is supported so that the nozzle train of the print head 28 may be faced by the top face of a platen 26 in a part in the meantime. And an image is recorded one by one in the ink which vertical-scanning delivery is carried out and breathed out from the nozzle of the print head 28 with the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d.
[0032] While it is having vertical-scanning delivery carried out by the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d, a print sheet P is supported by upstream supporter 26sf and 26 steradians of downstream supporters, and passes through the opening top of 26m of central slots. Since the part by the side of after that is supported by upstream supporter 26sf when the front end Pf of a print sheet P passes along 26m top of central slots, the front end Pf does not fall in 26m of central slots. Moreover, since the part by the side of before [the] is supported by 26 steradians of downstream supporters when the back end Pr of a print sheet P passes along 26m of central slots, the back end Pr does not fall in 26m of central slots. In addition, the slot does not necessarily need to be prepared in the center of the direction of vertical scanning of a platen, and should just be established in the location which faces the nozzle group located within the limits of predetermined [of the direction of vertical scanning of two or more nozzles (dot formative element) of the print head / of the central neighborhood].
[0033] Next, the internal configuration of the control circuit 40 (refer to drawing 3) of a printer 22 is explained. The PC interface 45 which exchanges data with the computer 90 besides CPU41, PROM42, and RAM43, the buffer 44 for a drive which outputs ON of an ink dot and the signal of OFF to the heads 61-66 for ink regurgitation are formed in the interior of a control circuit 40, and these components and circuits are mutually connected by bus. A control circuit 40 stores the dot data processed by computer 90 in reception, stores this in RAM43 temporarily, and outputs it to the buffer 44 for a drive to predetermined timing.
[0034] Conveying Form P by the paper feed motor 23, it makes carriage 31 reciprocate by the carriage motor 24, drives the piezo-electric element of each nozzle unit of the print head 28 to coincidence, performs the regurgitation of each color ink droplet Ip, forms an ink dot, and the printer 22 which has the hardware configuration explained above forms a multicolor image on Form P.
[0035] Selection of B-2. image print mode: Drawing 6 is a flow chart which shows the procedure of printing processing. The printer 22 has the periphery of a print sheet P, i.e., the 1st image print mode which prints without preparing a margin in an vertical and horizontal edge, and the 2nd image print mode which prints by leaving a margin to the periphery of a print sheet P. A printer 22 prints only by the nozzle group Nm by the 1st image print mode to printing using all nozzles in the 2nd image print mode. As shown in drawing 6 , a user chooses the 1st image print mode or the 2nd image print mode first on the occasion of printing. And the selection information of an image print mode is inputted to application 95 through input devices connected to the computer 90 (refer to drawing 2), such as a keyboard 14 and a mouse 13. Application 95 and a printer driver 96 prepare print-data PD according to the selected image print mode.

[0036] Drawing 7 is the top view showing the relation of the image data D and the print sheet P in the 1st image print mode. In the 1st image print mode, image data D is set up to the outside of a print sheet P exceeding the upper limit Pf of a print sheet P. Moreover, image data D is similarly set up to the outside of a print sheet P across the edge of a print sheet P about a lower limit Pr, the left-hand side edge Pa, and the right-hand side edge Pb. Therefore, in the 1st image print mode, the relation between the assumption location of the magnitude of image data D and a print sheet P and image data D at the time of printing and arrangement of a print sheet P comes to be shown in drawing 7 . In the 1st image print mode, an image is printed without a margin to the edge of a print sheet based on this image data D. In addition, about the name of right and left of the left-hand side edge Pa and the right-hand side edge Pb, since it was made to correspond with the name of right and left of a printer 22, in the print sheet P, actual right and left and the name of the left-hand side edge Pa and the right-hand side edge Pb are reverse.

[0037] In addition, on these specifications, when the image data recorded on a print sheet P makes it correspond up and down and it calls the edge of a print sheet P, the word of "upper limit (section)" and "a lower limit (section)" is used. And when making it correspond to the travelling direction of vertical-scanning delivery of the print sheet P on a printer 22 and calling the edge of a print sheet P, the word of "the front end (section)" and "the back end (section)" may be used. On these specifications, in a print sheet P, "upper limit (section)" corresponds to "the front end (section)", and "a lower limit (section)" corresponds to "the back end (section)."

[0038] Drawing 8 is the top view showing the relation of the image data D2 and print sheet P in the 2nd image print mode. As shown in drawing 8 , in the 2nd image print mode, image data D2 is data for forming an image in a field smaller than a print sheet P. And an image establishes a margin vertically and horizontally on a print sheet P, and is printed.

[0039] B3. printing: The patterns of vertical-scanning delivery in the case of printing differ by the 1st image print mode and the 2nd image print mode. Below, it divides into the 1st image print mode and the 2nd image print mode, and vertical-scanning delivery in the case of printing is explained.

[0040] (1) Vertical-scanning delivery in the 1st image print mode : drawing 9 is the explanatory view showing how each raster is recorded by which nozzle in the 1st image print mode. Here, in order to simplify explanation, it explains among the nozzle trains existing [two or more] only using the nozzle train of one train. And the nozzle train of one train shall have 13 nozzles. And each nozzle shall open spacing for three rasters, and shall be allotted. In addition, in the 1st image print mode, five nozzles (nozzle group Nm) of the center of the 13 nozzles are used.

[0041] In drawing 9 , the grid of one train perpendicularly located in a line expresses the print head 28. The figure of 5-9 in each grid shows the nozzle number. That is, in the 1st image print mode, only five nozzles of #5-#9 are used among 13 nozzles. In addition, in a specification, "#" is given to the number of a nozzle and each nozzle is expressed. Drawing 9 shifts and shows in order the print head 28 sent relatively [direction / of vertical scanning] to the right from the left with time amount. As shown in drawing 9 , Sadanori delivery of every 5 dots is performed in the 1st image print mode. Consequently, each raster has a dot recorded by one nozzle, respectively. In addition, the "dot" of the unit of a vertical-scanning feed per revolution means the pitch for 1 dot corresponding to the print resolution of the direction of vertical scanning, and this [its] is equal also to the pitch of a raster. The nozzle surrounded with the thick frame in drawing 9 is a nozzle which records a dot on a raster.

[0042] On the other hand, in drawing 9 , a nozzle does not pass the 2-4th, 7 or the 8th, and the 12th raster once from the maximum upper case. That is, a dot is unrecordable on these rasters. Therefore, in this example, it shall not carry out using it, in order that the raster from these maximum upper case to the 12th may record an image. That is, the raster which can be used in order to record an image in this example is taken as the raster of the 13th henceforth from the edge of the direction upstream of vertical scanning among the rasters on which the nozzle on the print head 28 can record a dot. The field of the raster which can be used in order to record this image is called "the field which can be printed." Moreover, the field of the raster which is not used for image recording is called a "printing improper field." In drawing 9 , the number

attached sequentially from the top is indicated on the left-hand side of drawing about the raster on which the nozzle on the print head 28 can record a dot. Henceforth, also in the drawing explaining record of the dot of upper limit processing, it is the same.

[0043] Drawing 10 is the explanatory view showing the print head 28 at the time of printing initiation, and the relation of a print sheet P. Here, 26m of central slots is counted from the nozzle of the 28 print head#5, and from the location of 2 raster quota, they shall be counted from the nozzle of #9 and shall be established in range R26m to a next location by two rasters. Therefore, even when an ink droplet Ip is made to breathe out from each nozzle in the condition that there is no print sheet, the ink droplet from the nozzle of #5-#9 does not reach platen 26 top face (upstream supporter 26sf, 26 steradians of downstream supporters).

[0044] At the time of printing initiation, the upper limit Pf of a print sheet P has a nozzle on the print head 28 in the location of the 23rd raster from the edge of the direction upstream of vertical scanning among the rasters which can record a dot, as shown at drawing 9 . That is, the upper limit of a print sheet P will be in an upstream (a part for two rasters [#] of the nozzle of 10 upstream) location by six rasters of the nozzle of #9 (refer to drawing 10). Although the raster (it sets to drawing 9 and is the 13th raster from a top) of the maximum upper case of the field which can be printed should be recorded by the nozzle of #8 and the 5th raster (it sets to drawing 9 and is the 17th raster from a top) should be recorded by the nozzle of #9 if it is that carry out and backlash starts printing from this condition, under those nozzles, there is still no print sheet P. Therefore, if the print sheet P is correctly sent with the upstream paper feed rollers 25a and 25b, the ink droplet Ip breathed out from nozzle #8 and #9 will fall to 26m of central slots as it is. The same thing can say also about the case where the raster (it sets to drawing 9 and is a raster from a top to the 22nd) from the field which can be printed to the 10th is recorded.

[0045] However, when more print sheets P than an original feed per revolution have been sent for a certain reason, the upper limit of a print sheet P is the 11th (assumption upper limit location.) from the field which can be printed. In drawing 9 , it may come to the location of the raster above the 23rd raster from a top. In this example, since the ink droplet Ip is breathed out to those rasters such even case, an image can be recorded on the upper limit of a print sheet P, and a margin is not made. That is, when more print sheets P than an original feed per revolution have been sent and the excessive feed per revolution is the following by ten rasters (location shown with an alternate long and short dash line in drawing 10), a margin is not made to the upper limit of a print sheet P.

[0046] On the contrary, it is also considered by a certain reason that a print sheet P will be sent fewer than an original feed per revolution. In such a case, there will be no print sheet in the location which should have a print sheet essentially, and an ink droplet Ip will reach the downward structure. However, each raster is to be recorded with the nozzle of #5-#9 in the 1st image recording mode, as shown in drawing 10 . And 26m of central slots is prepared under these nozzles. Therefore, even if an ink droplet Ip does not reach a print sheet P, the ink droplet Ip will fall to 26m of central slots, and will be absorbed by 27m of absorption members. Therefore, an ink droplet Ip reaches the platen 26 top-face section, and does not soil a print sheet behind. That is, in this example, even when the upper limit Pf of a print sheet P is more back than an assumption upper limit location at the time of printing initiation, an ink droplet Ip reaches the platen 26 top-face section (upstream supporter 26sf, 26 steradians of downstream supporters), and does not soil a print sheet P behind.

[0047] About printing of the lower limit of a print sheet P, a dot is similarly formed on a print sheet P of the nozzle of 26m of central slots based on image data D (refer to drawing 7) currently installed across the lower limit. For this reason, an image can be printed without a margin also about printing of the lower limit of a print sheet P, without soiling a platen 26.

[0048] Drawing 11 is the explanatory view showing printing of the right-and-left side edge section of the print sheet P in the 1st image print mode. As shown in drawing 11 and drawing 5 , 26m of central slots is established in the main scanning direction for a long time than the width of face of a print sheet P, respectively. moreover, the print sheet P -- Guides 29a and 29b (refer to drawing 5) -- the main scanning direction of 26m of central slots -- mostly, it is positioned

and is sent in the center. And on the occasion of formation of the dot to a print sheet P top, a dot is formed of the nozzle on 26m of central slots (#5-#9) based on image data D (refer to drawing 7) currently installed across the edge on either side. As shown in drawing 11 , when a nozzle is in the location which faces the side edge section of a print sheet P in that case, and when it is in the location which is the field of the outside of a print sheet P, and faces 26m of central slots, an ink droplet is breathed out and a dot is recorded. Therefore, it can print without a margin also with the edge of right and left of a print sheet P, without soiling a platen 26.

[0049] In printing in the 1st image print mode, it prints about the direction of vertical scanning only using the nozzle on a slot. Moreover, about a main scanning direction, in horizontal scanning, when it is on the nozzle fang furrow section, it prints. Therefore, an image can be printed to the edge of print media, without soiling a platen.

[0050] Print media is not sent on a platen at the proper sense, but the above-mentioned effectiveness is similarly demonstrated, when Rhine of an edge has become slanting to a main scanning direction. And even if vertical-scanning delivery of the print media is carried out proper, the same is said of the case where it is the trapezoid print media and the print media whose configuration of an edge is not linear to which Rhine of an edge does not become in parallel with a main scanning direction. Furthermore, the hole has not opened in part in print media, or even if print media is a mesh-like thing and it is the case where some ink droplets pass print media, a platen top face is not soiled. Moreover, if ink will get dry by the time it passes through a slot also when an ink droplet reaches print media and even the background of print media is permeated, a platen top face will not be soiled.

[0051] In addition, when printing without a margin to an edge to print media predetermined [these], a user specifies the class (class decided by size, the configuration, the quality of the material, etc.) of print media, and can print by specifying the purport which prints without a margin to an edge. Assignment of the class of print media can also be made into the format which a user chooses from the alternative prepared beforehand, and the user himself sets up various parameters (size, a configuration, quality of the material, etc.), and the class of print media can be set up.

[0052] As explained above, in the 1st image print mode, CPU41 prints by controlling each part. That is, CPU41 functions as the "1st control section" said to a claim. And CPU41 functions also as the "side edge printing section" said to a claim. 1st control-section 41a as a function part of these CPUs41 and side edge printing section 41b are shown in drawing 3 .

[0053] (2) Vertical-scanning delivery in the 2nd image print mode : all the nozzles to #1-#13 are used in the 2nd image print mode. In addition, it is the semantics ["use / all nozzles"] here "all nozzles are usable if needed." Therefore, a certain nozzle may not be used depending on the data of the image to print.

[0054] Drawing 12 is the explanatory view showing how each raster is recorded by which nozzle in the 2nd image print mode. it is shown in drawing 12 -- as -- the 2nd image print mode -- setting -- the law of 13 dots -- rule delivery is performed. Consequently, each raster has a dot recorded with one nozzle. In the 2nd image print mode, a large printing improper field is made in the upper limit and lower limit of a print sheet P compared with the 1st image print mode, respectively. For example, in drawing 9 , although the printing improper field by the side of upper limit was a part for 12 rasters from upper limit, in drawing 12 , it is a part for 36 rasters. Supposing the location of the raster of the maximum upper case in which the print head can form a dot is an assumption upper limit location of a print sheet P, the field for these 36 rasters will serve as a margin in the upper limit of a print sheet P. In the 2nd image print mode, a dot is formed by nozzle #5-#9 located on 26m of central slots. However, in the 2nd image print mode which prints by leaving a margin to the edge of a print sheet P, since there is little possibility that an ink droplet will be breathed out outside exceeding the margin of a print sheet P, there is no un-arranging. On the other hand, in the 2nd image print mode, since all the nozzles to #1-#13 are used, compared with the 1st image print mode which prints with the limited nozzle, high-speed printing is realizable.

[0055] As explained above, in the 2nd image print mode, CPU41 prints by controlling each part. That is, CPU41 functions as the "2nd control section" said to a claim. 2nd control-section 41c

as a function part of this CPU41 is shown in drawing 3 .

[0056] C. The 2nd example : drawing 13 is the side elevation showing the print head 28 in the 2nd example, and the relation of central slot 26ma. Here, central slot 26ma explains the airline printer of a mode with which nozzle #4-#9 are prepared caudad. Other points are the same configurations as the airline printer of the 1st example.

[0057] Overlap printing is performed in this 2nd example. That is, each raster has a dot recorded by two horizontal scanning with two nozzles. And all of nozzle #1-#13 are used in the 2nd image print mode which prints only using nozzle #4-#9 and prints by establishing a margin in the 1st image print mode which prints an image, without preparing a margin in a print sheet P. Since nozzle #4-#9 exist in the range which faces central slot 26ma, the ink droplet breathed out from nozzle #4-#9 reaches the target in central slot 26ma, without reaching the top face of platen 26a, also when a print sheet P is not reached. Let these nozzle #4-#9 be the nozzle group Nma.

[0058] (1) Vertical-scanning delivery in the 1st image print mode : drawing 14 is the explanatory view showing how each raster is recorded by which nozzle in the 1st image print mode of the 2nd example. In this 1st image print mode, no nozzles other than the nozzle of #4-#9 of the print head 28 are used. and it is shown in drawing 14 -- as -- the law of every 3 dots -- rule delivery is performed. Consequently, each raster is recorded by two different nozzles. The nozzle surrounded with the thick frame in drawing is a nozzle which records a dot on a raster.

[0059] In drawing 14 , one nozzle only passes the 15th and the 18th raster from the maximum upper case in the case of printing. Therefore, about these rasters, with two nozzles, can share a pixel and it cannot be printed. Therefore, in this example, it shall not carry out using it, in order that the field more than the 18th raster where such a raster exists may record an image. That is, in this example, the field which can be printed is the raster of the 19th henceforth from the edge of the direction upstream of vertical scanning.

[0060] In the 2nd example, the raster (field which can be printed) of the 19th henceforth can be used from the edge of the direction upstream of vertical scanning among the rasters on which the nozzle on the print head 28 can record a dot, and an image can be recorded. Therefore, the image data D2 used for printing is set up from the 19th raster. However, since it is the same as that of the 1st example, printing is started from the time of being in the location of the 31st raster, when the upper limit of a print sheet P is in the 19th location from the edge of the direction upstream of vertical scanning. That is, the assumption location of the upper limit of a print sheet P to each raster at the time of printing initiation is a location of the 31st raster from the edge of the direction upstream of vertical scanning, as shown in drawing 14 . Therefore, in the 2nd example, image data D2 is formed by 12 rasters across the location of the upper limit of the print sheet P assumed. For this reason, if that error is less than by 12 rasters even if an error will arise in delivery of a print sheet P and a print sheet P will be sent to it too much, an image can be formed without a margin to the upper limit of a print sheet P.

[0061] Moreover, in the 2nd example, each raster is recorded only by nozzle #4-#9. And central slot 26ma is prepared under nozzle #4-#9. Therefore, even if it breathes out an ink droplet to 12 above-mentioned rasters which surpassed the assumption location of the upper limit of a print sheet P, and were set up (in namely, range in which a print sheet does not exist), an ink droplet is not made to reach the target on platen 26a. Moreover, where the error arose in delivery of a print sheet P and a print sheet P is not sent to it to an assumption location, even if it breathes out an ink droplet to the raster assigned to the upper limit section of a print sheet P, an ink droplet is not made to reach the target on platen 26a.

[0062] (2) Vertical-scanning delivery in the 2nd image print mode : drawing 15 is the explanatory view showing how each raster is recorded by which nozzle in the 2nd image print mode of the 2nd example. All the nozzles to #1-#13 are used in the 2nd image print mode. As shown in drawing 15 , in the 2nd image print mode, the whole printing is covered and vertical-scanning delivery of 6 dots and 7 dots is repeated. Consequently, overlap printing in which a dot is formed with two nozzles about each raster is performed.

[0063] In the 2nd image print mode, a large printing improper field is made in the upper limit and lower limit of a print sheet P compared with the 1st image print mode, respectively. For example, in drawing 14 , although the printing improper field by the side of upper limit was a part for 18

rasters from upper limit, in drawing 15 , a printing improper field is a part for 42 rasters. If the location of the raster of the maximum upper case is made into the assumption upper limit location of a print sheet, the field for these 42 rasters will serve as a margin in the upper limit of a print sheet P. In this 2nd image print mode, since all the nozzles to #1-#13 are used, compared with the 1st image print mode which prints with the limited nozzle, high-speed printing is realizable.

[0064] D. modification: -- the range which this invention is not restricted to an above-mentioned example or an above-mentioned operation gestalt, and does not deviate from that summary in addition -- setting -- various voice -- it is possible to set like and to carry out, for example, the following deformation is also possible.

[0065] D1. modification 1: In the 1st example, 26m of central slots was prepared under nozzle #5-#9, and frameless printing in the 1st image print mode was performed by nozzle #5-#9. And in the 2nd example, slot 26ma was prepared under nozzle #4-#9, and frameless printing in the 1st image print mode was performed by nozzle #4-#9. However, the relation of the nozzle and slot which print the edge of a print sheet is not restricted to these. For example, it is good also as the number of nozzles of a nozzle train preparing 26m of central slots under nozzle #17-#32, and printing the 1st image print mode by nozzle #17-32 in the mode whose number is 48.

[0066] Drawing 16 and drawing 17 are the explanatory views showing the relation of the print head 28 and the print sheet P at the time of printing the upper limit section of a print sheet in a modification. In the above-mentioned example, the slot was 26m of central slots in the location which faces the specific nozzle located within the limits of predetermined [of the direction of vertical scanning of two or more nozzles / of the central neighborhood] (refer to drawing 10 and drawing 13). However, the relation between a slot and a nozzle is not restricted to this. That is, as shown in drawing 16 , 27f of slots may be established in the location which faces the nozzle group (nozzle #9-#13) which does not contain nozzle #1 located in a down-stream edge including nozzle #13 located in the edge of the upstream of the direction of vertical scanning of two or more nozzles. Moreover, as shown in drawing 17 , slot 27r may be prepared in the location which faces the nozzle group (nozzle #1-#5) which does not contain nozzle #13 located in an upstream edge including nozzle #1 located in the edge of the lower stream of a river of the direction of vertical scanning of two or more nozzles. Furthermore, it is good also as arranging in the direction of vertical scanning and preparing two or more slots. That is, an image can be printed to the edge of print media, without soiling forming a dot about the edge which prints an image, without establishing the margin of print media only using the nozzle in the location which faces a slot, then a platen, even if the slot is established in the range which faces which nozzle.

[0067] Moreover, in the example, the nozzle group Nm used by the 1st image print mode was a nozzle which has the nozzle number same about the nozzle train of each color, and is prepared in the same range about the direction of vertical scanning. However, the nozzle used by the 1st image print mode within each nozzle train does not necessarily need to be a nozzle prepared in the range same about the direction of vertical scanning, and may be a nozzle group prepared in a location which is different about the direction of vertical scanning. That is, if the nozzle group prepared in the location which faces a slot is used and a dot is formed in print media, an image can be printed without a margin to an edge, without soiling a platen.

[0068] However, the ink of two or more colors can be used also in the mode which establishes a slot in a platen so that the nozzle group Nm which consists of a nozzle of each nozzle train used by the 1st image print mode may be faced, then the 1st image print mode. And the part in which the slot is not established in the part which faces other nozzles will exist a slot in one, then a platen. Therefore, a print sheet can be effectively supported in the part.

[0069] D2. modification 2: In the above-mentioned example, the image set up exceeding the upper limit of a print sheet was a part for ten rasters in the 1st example, and were 12 rasters in the 2nd example. However, the magnitude of the image set up across the edge of a print sheet is not restricted to this. For example, width of face of the part of image data D set up to the outside of a print sheet P exceeding the upper limit Pf of a print sheet P can be considered as an equivalent for 1/[of the width of face of 26m of central slots] 2. Similarly, width of face of the part of image data D set up to the outside of a print sheet P across the lower limit Pr of a

print sheet P can be considered as an equivalent for 1/[of the width of face of 26m of central slots] 2. Namely, the width of face of the part of the image data set up to the outside of a print sheet across the edge of a print sheet should be just smaller than the width of face of 26m of central slots. If it is made such, also when there will be nothing in the location which the edge of a print sheet P assumed, the ink droplet Ip for recording the image set up over the print sheet P does not reach platen 26 top face. However, the comparable amount of gaps is permissible also about the case where it shifts to the downstream also about the case where 1/2 of the width of face of a slot, then a print sheet P shift to the upstream.

[0070] D3. modification 3: In each above-mentioned example, although only upper limit processing was shown, it can carry out similarly about lower limit processing. And it is good also as performing both upper limit processing and edge processing, the need is accepted, and it may be made to perform only a gap or one side.

[0071] D4. modification 4: Drawing 18 is the top view showing the fields Rf and Rr which print by the 1st image print mode, and the field Rm which prints by the 2nd image print mode in a print sheet P. In each above-mentioned example, the 1st image print mode and the 2nd image print mode decided to carry out alternatively (refer to drawing 6). However, in printing to one print sheet, it is good also as carrying out both the 1st image print mode and the 2nd image print mode. For example, suppose that it prints by the 2nd image print mode which forms a dot and uses other nozzles in pars intermedia Rm by the 1st image print mode which uses only Mizogami's nozzle about the fields Rf and Rr for printing the upper limit section Pf of a print sheet P, and the lower limit section Pr, respectively.

[0072] Drawing 19 is the explanatory view showing the relation of the print head 28 and the print sheet P at the time of printing the upper limit section of a print sheet in a modification. It can print using nozzle #10-#13 which do not face the center section Pm of the print sheet P with a slot about the field Rm corresponding to coincidence, printing only using nozzle #5-#9 which face a slot about the upper limit section Pf of a print sheet P, and the corresponding field Rf. It can print using nozzle #1-#4 which do not face the center section Pm of the print sheet P with a slot about the field Rm corresponding to coincidence, printing only using nozzle #5-#9 which face a slot about the lower limit section Pr of a print sheet P, and the corresponding field Rr similarly.

[0073] An image can be printed to the edge of a print sheet, without soiling a platen, as long as it is on the location fang furrow of the edge of a print sheet even if it shifts from the location which the location of such a mode, then the edge of a print sheet assumed. And compared with the case where it prints only using the nozzle which faces a slot, it can print at a high speed.

[0074] Here, image data D3 is set even to the range in which only a vertical edge exceeds a print sheet P, and is set as the field settled in a print sheet P about right and left. It can print that there is no margin about such a mode then upper limit, and a lower limit. And since the 2nd image print mode is carried out in pars intermedia Rm, compared with the case where all fields are printed by the 1st image print mode, it can print at a high speed. Moreover, in this modification 4, about the side edge section on either side, it leaves a margin and an image is printed. Therefore, even if it prints using nozzles other than the nozzle prepared for Mizogami in the case of printing of pars intermedia Rm, an ink droplet does not reach the top face of a platen.

[0075] D5. modification 5: You may make it transpose a part of configuration of that hardware was realized to software, and may make it transpose a part of configuration of that software realized to hardware conversely in the above-mentioned example. For example, a host computer 90 can perform a part of function of CPU41 (drawing 3).

[0076] The computer program which realizes such a function is offered with the gestalt recorded on the record medium which a floppy disk, CD-ROM, etc. can computer read. A host computer 90 reads a computer program in the record medium, and transmits it to internal storage or external storage. Or you may make it supply a computer program to a host computer 90 from a program feeder through a communication path. When realizing the function of a computer program, the computer program stored in internal storage is performed by the microprocessor of a host computer 90. Moreover, a host computer 90 may be made to carry out immediate

execution of the computer program recorded on the record medium.
[0077] In this specification, in the host computer 90, it is a concept containing hardware and operation system, and the hardware which operates under control of operation system is meant. A computer program makes such a host computer 90 realize the function of above-mentioned each part. In addition, a part of above-mentioned function may be realized by not an application program but operation system.
[0078] In addition, in this invention, not only the record medium of a flexible disk or a pocket mold like CD-ROM but the internal storage in computers, such as various kinds of RAM and ROM, and the external storage currently fixed to computers, such as a hard disk, are included with "the record medium in which computer reading is possible."

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The side elevation showing the surrounding structure of the print head of the ink jet printer in the gestalt of operation of this invention.
[Drawing 2] The block diagram showing the configuration of the software of this airline printer.
[Drawing 3] Drawing showing the configuration of the machine part of this airline printer.
[Drawing 4] The explanatory view showing the array of the ink jet nozzle N in the print head 28.
[Drawing 5] The top view showing the circumference of a platen 26.
[Drawing 6] The flow chart which shows the procedure of printing processing.
[Drawing 7] The top view showing the relation of the image data D and the print sheet P in the 1st image print mode.
[Drawing 8] The top view showing the relation of the image data D2 and print sheet P in the 2nd image print mode.
[Drawing 9] The explanatory view showing how each raster is recorded by which nozzle in the 1st image print mode.
[Drawing 10] The side elevation showing the print head 28 at the time of printing initiation, and the relation of a print sheet P.
[Drawing 11] The explanatory view showing printing of the right-and-left side edge section of the print sheet P in the 1st image print mode.
[Drawing 12] The explanatory view showing how each raster is recorded by which nozzle in the 2nd image print mode.
[Drawing 13] The side elevation showing the print head 28 in the 2nd example, and the relation of central slot 26ma.
[Drawing 14] The explanatory view showing how each raster is recorded by which nozzle in the 1st image print mode of the 2nd example.
[Drawing 15] The explanatory view showing how each raster is recorded by which nozzle in the 2nd image print mode of the 2nd example.
[Drawing 16] The explanatory view showing the relation of the print head 28 and the print sheet P at the time of printing the upper limit section of a print sheet in a modification.
[Drawing 17] The explanatory view showing the relation of the print head 28 and the print sheet P at the time of printing the upper limit section of a print sheet in a modification.
[Drawing 18] The top view showing the fields Rf and Rr which print by the 1st image print mode, and the field Rm which prints by the 2nd image print mode in a print sheet P.
[Drawing 19] The explanatory view showing the relation of the print head 28 and the print sheet P at the time of printing the upper limit section of a print sheet in a modification.
[Drawing 20] The side elevation showing the circumference of the print head of the conventional printer.
[Description of Notations]
12 -- Scanner
13 -- Mouse
14 -- Keyboard
21 -- CRT

22 -- Printer
23 -- Paper feed motor
24 -- Carriage motor
25a, 25b -- Upstream paper feed roller
25c, 25d -- Downstream paper feed roller
25p, 25q -- Upstream paper feed roller
25r, 25s -- Downstream paper feed roller
26, 26a, 26o -- Platen
26sf(s) -- Upstream supporter
26m, 26ma -- Central slot
26 steradians -- Downstream supporter
27m -- Absorption member
28 -- Print head
28o -- Head
29a, 29b -- Guide
31 -- Carriage
32 -- Control panel
34 -- Sliding shaft
36 -- Driving belt
38 -- Pulley
39 -- Location detection sensor
40 -- Control circuit
41 -- CPU
42 -- PROM
43 -- RAM
44 -- Buffer for a drive
45 -- PC interface
61-66 -- Head for ink regurgitation
67 -- Introductory tubing
68 -- Ink path
71 -- Cartridge
72 -- Cartridge for color ink
90 -- Host computer
91 -- Video driver
95 -- Application program
96 -- Printer driver
97 -- Resolution conversion module
98 -- Color correction module
99 -- Halftone module
100 -- Rasterizer
A -- Arrow head
D, D2, D3 -- Image data
DT -- Dot formation pattern table
Ip -- Ink droplet
LUT -- Color correction table
N -- Ink jet nozzle
Nm, Nma -- Nozzle group
ORG -- The Hara color picture data
P -- Print sheet
PD -- Print data
Pa -- Left-hand side edge
Pb -- Right-hand side edge
Pf -- Upper limit (section)
Pr -- Lower limit (section)

R26m -- Range in which the slot is established
Rf -- Field which prints by the 1st image print mode
Rm -- Field which prints by the 2nd image print mode (pars intermedia)
Rr -- Field which prints by the 1st image print mode
k -- Nozzle pitch

[Translation done.]